What is claimed is:

1. A process for joining a gas diffusion layer to a separator plate of an electrochemical cell, wherein the gas diffusion layer comprises a porous body, and the separator plate comprises at least one landing surface formed on a surface of the separator plate, and the separator plate and landing surface comprising a polymer and conductive filler, the process comprising the step of welding the landing surface to the gas diffusion layer by impregnating some of the polymer on the landing surface within a portion of the porous body.

2. The process of claim 1, wherein the welding step is selected from the group consisting of resistance welding, vibrational welding, ultrasonic welding, laser welding, heat lamination, and hot bonding techniques.

3. The process of claim 2, wherein the welding step is resistance welding.

4. The process of claim 3 wherein resistance welding comprises the further steps of:

   (a) placing the landing surface in contact with the gas diffusion layer;

   (b) applying an electrical current between the gas diffusion layer and the separator plate to produce localized heat at the landing surface sufficient to melt the polymer in the landing surface and produce molten polymer;

   (c) applying pressure to the landing surface and gas diffusion layer to allow the molten polymer to impregnate into the portion of the porous body; and

   (d) ceasing to apply the electrical current to allow the molten polymer to cool and solidify.

5. The process of claim 4, wherein the electrical current is between about 0.01 amperes/mm^2 and about 5 amperes/mm^2, preferably between about 0.8 and about 1.1 amperes/mm^2, its voltage is between about 1 and about 25 volts and the current is applied for a time from about 0.5 to about 100 seconds.

6. The process of claims 4 or 5 wherein the pressure applied is between about 1 and about 200 psig, preferably between about 10 and about 120 psig, more preferably between about 30 and about 70 psig.

7. The process of any one of claims 4 to 6 wherein the electrical current is applied using external electrodes.

8. The process of claim 2, wherein the welding step is vibration welding.

9. The process of claim 8, wherein the vibration welding step comprises the further steps of:

(a) placing the landing surface in contact with the gas diffusion layer;

(b) applying a vibrational force between the separator plate and the gas diffusion layer to produce localized heat at the landing surface sufficient to melt the polymer at the landing surface;

(c) applying pressure to the landing surface and gas diffusion layer to allow the molten polymer to impregnate into the portion of the porous body; and

(d) ceasing to apply the vibrational force to allow the molten polymer to cool and solidify.

10. The process of claim 9, wherein the vibrational force is applied at a frequency of between about 100 and about 500 cycles per second for a time from about 3 to about 100 seconds at an amplitude of between about 0.5 and about 5 mm.

11. The process of claims 9 or 10, wherein the pressure applied is between about 1 and about 200 psig, preferably between about 10 and about 120 psig, more preferably between about 30 and about 70 psig.

12. The process of any one of claims 1 to 11, wherein the polymer is a thermoplastic polymer selected from the group consisting of melt processible polymers, partially fluorinated polymers, thermoplastic elastomers, liquid crystalline polymers, polyolefins, polyamides, aromatic condensation polymers, and mixtures thereof.

13. The process of claim 12, wherein the polymer is a blend of about 1 wt% to about 30 wt%, preferably about 5 wt% to about 25 wt%, of maleic anhydride modified polymer with the thermoplastic polymer, partially fluorinated polymers and liquid crystalline polymer or mixtures thereof.

14. The process of any one of claims 1 to 13, wherein the conductive filler is graphite fiber or graphite powder.

15. The process of any one of claims 1 to 14, wherein the landing surface comprises a polymer rich outer layer.

16. The process of claim 15, wherein the polymer rich outer layer comprises between about 25 wt% and about 100 wt% polymer, preferably between about 50 wt% and about 100 wt% polymer, and most preferably about 100 wt% polymer.

17. An electrochemical cell component comprising a gas diffusion layer welded to a separator plate using the process of any one of claims 1 to 16.

18. An electrochemical cell comprising a gas diffusion layer welded to a separator plate using the process of any one of claims 1 to 16.

19. An electrochemical cell comprising the fuel cell component of claim 17.

20. An electrochemical cell stack comprising a plurality of the electrochemical cells of claims 18 or 19.

21. An electrochemical cell component of claim 17, wherein the electrochemical cell component has a resistivity less than a resistivity of a system comprising a gas diffusion layer that is not welded to a plate.

22. An electrochemical cell component of claim 17, wherein the surface of the separator plate comprises open flow field channels and the gas diffusion layer does not sink into the open flow field channels.